

two Annelida (1. *Umbellisyllis fasciata*, 2. *Parumphinome pulchella*); two Anthozoa (1. *Mopsea borealis*, 2. *Fungiacyathus fragilis*); three Spongiæ (1. *Trichostemma hemisphæricum*, 2. *Cladorhiza abyssicola*, 3. *Hyalonema longissimum*). Each species is illustrated by numerous beautiful figures of the animals and their details by Mr. George Sars, which are engraved on six closely packed quarto plates. Many of the species described were found and described by Prof. Sars; and the account of them has been carefully revised by his son. The work will be continued if Mr. Sars can "obtain the necessary assistance." It is to be hoped that the sale of so important and so conscientious a contribution to this branch of zoology will obtain sufficient support to enable it to be completed.

MISCELLANEOUS.

On Noctiluca miliaris, Sur. By M. L. CIENKOWSKI.

M. CIENKOWSKI has found *Noctiluca miliaris* in abundance at Odessa, from which place it extends on one side into the Sea of Azov, and on the other as far as Smyrna.

The only new information on the organization of the adult animal that we find in his memoir is—the description of a papilla upon which is inserted the vibratile filament discovered by Krohn, and some details as to the movements of the protoplasm which take place in the interior of the nucleus. But the portion relating to the reproduction of this curious organism is of more importance, and contains interesting observations which extend and correct our knowledge on this subject.

M. Cienkowski confirms the facts of reproduction by division described by Mr. Brightwell. This division is observed both in encysted *Noctiluca* and in those which present the normal structure. In the encysted *Noctiluca* the tentacle appears before the separation of the two individuals is completed; in the normal *Noctiluca*, on the contrary, two tentacles may be found at the commencement of the period of constriction.

Numerous observations on the regeneration of the different parts of the animal, checked by artificial removals of larger or smaller portions of the body, have convinced M. Cienkowski that the forms described by Busch as young *Noctiluca* produced by an internal gemination cannot be so interpreted. They are simply portions of protoplasm in process of reproduction. When an individual has been deprived of a portion of its substance, it is able to complete itself. It would even seem that portions of protoplasm issuing from the body under the action of compression may give birth to new complete individuals.

The author has followed more completely than before* the mode

* Cienkowski, "Ueber Schwärmerbildung bei *Noctiluca miliaris*," Arch. für mikr. Anat. vii. (1871) p. 131.

of origin of the zoospores which are found in great numbers in the encysted *Noctiluca*.

The encysted *Noctiluca*, which are met with at all periods of the year at the same time with individuals of normal organization, present the appearance of spherical vesicles, having neither the depression at the bottom of which the mouth is situated, nor the tentacle, nor the tooth, but always possessing the nucleus and the streaks of protoplasm.

Individuals are met with showing transitions between the normal *Noctiluca* and these vesicles, deprived of many of the characteristic organs of the species. The tentacle may disappear in a *Noctiluca* by its being drawn in; it may also become completely detached in *Noctiluca* which are becoming united. The buccal depression may also become effaced in consequence of the approximation and amalgamation of the projections which border it.

The zoospores originate at the surface of these encysted *Noctiluca* by a development of tubercular prominences, which afterwards become constricted at their base and finally separate and swim away by means of a long cilium.

First of all, four of these buds are produced at the surface (perhaps originally only two). They divide and become in a manner segmented and increase in number until they form a sort of superficial disk. While this phenomenon is going on, the protoplasm presses towards the side of the buds, leaving the other parts of the vesicle.

The zoospores at the moment of their becoming detached are formed of an inflated hood, covering a flattened oval vesicle containing a nucleus. To the sides of this vesicle is applied a prolongation which is connected on the one hand with the hood, and terminates in a fine point. In one of the angles formed by the union of the prolongation a long cilium is inserted. In many cases also an immovable cylindrical appendage starts from the hood and extends in the direction of the base of the vesicle.

M. Cienkowski was unable to keep these zoospores living for more than 24-28 hours, and consequently did not witness their transformation into *Noctiluca*.

Besides these zoospores, which may be regarded as representing the normal form, there may be found, attached to the surface of the *Noctiluca* by a short slender peduncle, vesicles which are often furnished with a cilium, a short appendage, an aculeus, and a nucleus sending some protoplasmic filaments to the periphery. These bodies, which have more resemblance than the former to complete *Noctiluca*, may become detached and move in the water. Their further fate is still unknown.

The production of the zoospores in the *Noctiluca* seems to be in relation with copulation; this copulation may take place between encysted or non-encysted individuals. The encysted individuals become united by the points which are nearest the nuclei. After a contact of one or two hours, one or several small apertures are seen at the spot where the union has taken place; and through these the filaments of the protoplasm combine. The amount of perforation increases, and

gradually causes the disappearance of the partition which separated the two vesicles.

In the non-encysted individuals nearly the same phenomena occur. The two *Noctiluca* unite by their buccal notches, which become gradually effaced; and the tentacles disappear, sometimes by becoming detached, sometimes by their being absorbed into the body.

Although M. Cienkowski has repeatedly witnessed all the phases of the copulation, and been able to preserve its products alive for two or three days, he has never seen in them any changes which would indicate a commencement of the formation of zoospores. Nevertheless the dimensions, and the lobate form, of most of the vesicles borne by the disks of zoospores are in favour of their relation to the products of copulation.

It is difficult, however, to pronounce an opinion as to the nature of this copulation, which seems to have nothing to do with a sexual act, but probably facilitates the formation of zoospores and has much analogy with the formation of the plasmodium in the Myxomycetes.

M. Cienkowski concludes, from the sarcodic nature of the contents of the *Noctiluca*, from the presence of the flagellum discovered by Krohn, and, finally, from the occurrence of a reproduction by active zoospores, that this organism must take its place in the class of the Flagellata, in which it should form a distinct group, in consequence of its striated tentacle.—*Archiv für mikr. Anat.* ix. (1872) p. 47; *Bibl. Univ.* 1873, *Bull. Sci.* p. 167.

Natal Sponges. By Dr. J. E. GRAY, F.R.S. &c.

In the Proc. Zool. Soc. 1873, pp. 17 & 21, Dr. Bowerbank has described two sponges, which he says were received from his friend Captain Charles Tyler, "who obtained them from Port Elizabeth." Captain Tyler kindly informs me that he bought these sponges of Mr. Cutter. The British Museum had the first pick of this collection from Port Elizabeth, so that they are both in the British Museum.

1. *Leuconia glomerosa*, Bowerbank (P. Z. S. 1873, p. 17, t. iv.), is the same as the species I long ago described and figured under the name of *Aphroceras alvicornis* (P. Z. S. 1858, p. 113, t. x.), from a specimen Dr. Harland received from Hongkong; but we have many specimens in the British Museum from Natal.

2. *Ciocalypta Tyleri*, Bowerbank (P. Z. S. 1873, p. 21, t. iv.). We have several specimens of this "interesting species" in the Museum from Natal; and Mr. Carter informs me that he can find no difference between it and the crumb-of-bread sponge (*Halichondria panicea*) of Ellis, Johnston, and Bowerbank, and it certainly cannot be more than a variety of that species. Dr. Bowerbank says that it is very like the typical species of the genus *Ciocalypta*. The genus *Ciocalypta* has always been a puzzle to me. Is that also described from a specimen of *Halichondria*, which he says is exceedingly closely allied to the Natal species?

If, as we have observed, *Haliphysema tubulatum* is a *Dictyocylindrus*, it is not strange that his *Ciocalypta* should prove to be nothing but a common *Halichondria panicea*.